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(56) Documents cited
 GB A 2167659 EPA 10068848
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 E2A
 A4L
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 F16B

(54) Clamp

(57) A clamp 3, which may form part of a hanger 1, comprises two fingers 9 and 11 pivotally connected together. Corresponding ends of the fingers form a pair of jaws which are biased together by means of a spring 23. The fingers are also connected by an integral flexible web 17 which allows the clamp to be moulded flat in one piece, the web interconnecting adjacent longitudinal sides of the fingers 9, 11 in the region of the pivot point.

Spring 23 is generally U-shaped the arms bearing against the outer surfaces of grooves 25, 27.

As seen in Figure 1 the hanger 1 comprising beam 5, clamps 3 and hanger 7 is integrally moulded (e.g. of polyurethane polystyrene) by forming fingers 9, 11 in side-by-side relationship with web 17 therebetween – the web may be removed before use of the clamp.

Pivotal connection may involve projection(s) on one finger and corresponding recess(es) in the other finger.

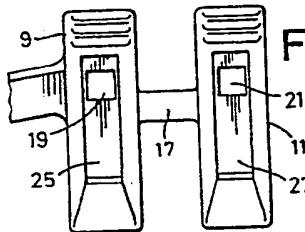


Fig. 3

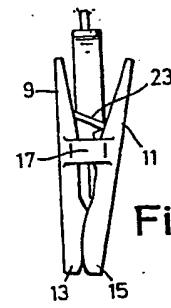


Fig. 2

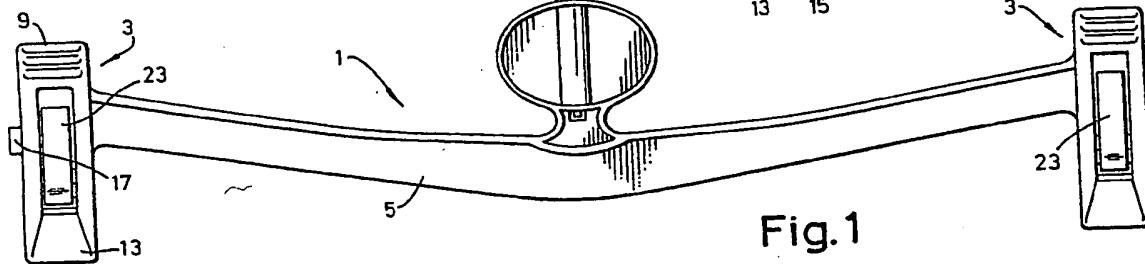


Fig. 1

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The drawing(s) originally filed was (were) informal and the print here reproduced is taken from a later filed formal copy.

Fig. 1

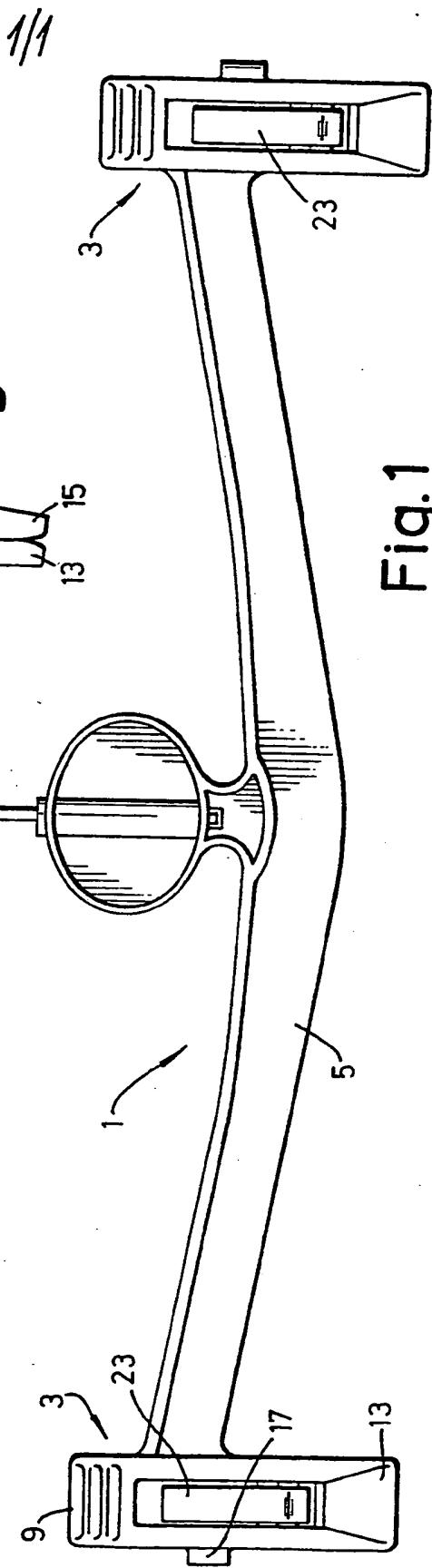


Fig. 2

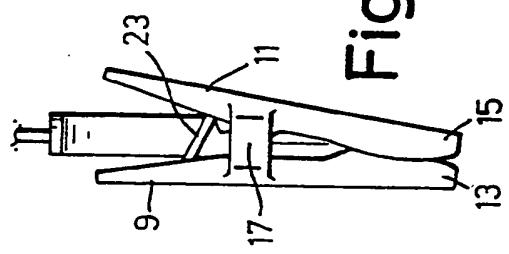
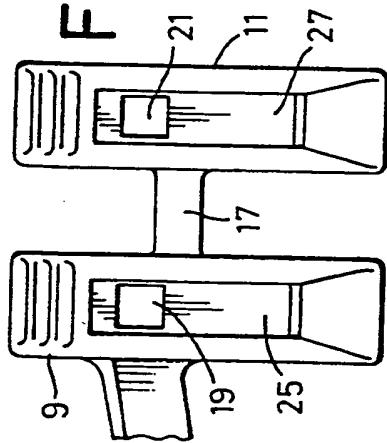


Fig. 3



SPECIFICATION

Spring clip

- 5 This invention relates to spring clips, and to devices such as clip hangers which incorporate such spring clips. The invention also relates to the manufacture of such clips and devices.
- One well-known design of spring clip, often used
 10 for clothes pegs, comprises two fingers which are pivotally connected at a point about halfway along their length, such that a pair of jaws is formed by corresponding ends of the fingers, means being provided to bias the jaws together. Such clips are
 15 usually made by moulding the two fingers separately, and then assembling them in a second operation. In some cases, such as when the clip forms part of a device such as a clip hanger, the two separate fingers may be moulded in a single
 20 operation, but such an operation is rendered comparatively complicated by the need to provide the mould with a movable insert to define the interior features of the clip.
- There have been a number of proposals for clip
 25 hangers in which the clips are moulded in a single piece. For example, EP-A-0068848 discloses a clip hanger having a pair of clips, each of which is constituted by a pair of elongate fingers joined at a point intermediate their ends by an integral flexible
 30 web which extends between the opposed surfaces of the fingers to form a fulcrum. This design suffers from the above-mentioned disadvantage that its manufacture involves the use of a mould with a movable insert.
- 35 WO-81/01361 discloses a clip hanger which is moulded in one piece from plastics material. It has a pair of clips, each of which has two jaws connected along a common edge by thin webs of plastics material. These webs constitute hinges for the clips.
- 40 Unlike the "clothes-peg" design, this arrangement does not provide a means for opening the jaws with sufficient mechanical advantage for conveniently overcoming the bias of a spring, and no spring is therefore used to bias the jaws together. Instead, a
 45 latch mechanism is employed for holding the jaws in the closed position. This makes the clip hanger disclosed in WO-81/01361 more awkward to operate than hangers with clips of the "clothes-peg" type. Moreover, the use of a hinge formed from a flexible
 50 web of plastics material imposes a severe restraint on the choice of materials available for moulding the hanger. The most commonly used plastics for moulded hangers are polypropylene, high impact polyurethane and polystyrene. The latter has the
 55 advantage of high rigidity, even at quite high temperatures, but this property means that it is not at all well suited for use as the material of a hinge. Polypropylene is therefore usually used in such applications, but it suffers from the disadvantage
 60 that it tends to display plastic creep if subjected to stress for prolonged periods.
- EP-A-0007246 also discloses a clip hanger having clips with an integral hinge, permitting it to be moulded flat in a single piece. Again, however, the
 65 use of a plastics hinge dictates that polypropylene

must be used as the material of the hanger, with the concomitant problem of plastic creep.

The hanger disclosed in EP-A-0007246 does include means for opening the clips against the bias of their respective springs. Integrally moulded outer panels are provided which fold back along the outside of the jaws of the clips, extending somewhat beyond the hinge to give the appropriate mechanical advantage. Unfortunately, this arrangement means
 70 that the clips extend over a very substantial length when opened out, as can best be seen from Figures 8 to 10 of EP-A-0007246. Such a design makes injection moulding difficult, because very high injection pressures are required to fill a large mould area at an
 75 economical rate.

According to the present invention there is provided a clip comprising a pair of fingers pivotally connected such that a pair of jaws is formed by corresponding ends of the fingers, and biasing
 80 means to bias the jaws together, wherein an integral flexible web connects a longitudinal side edge of one finger to the adjacent longitudinal side edge of the other finger. Such a clip can be manufactured in one moulding operation without the need for a mould
 85 insert to define the interior features of the clip. This is achieved by moulding the fingers side by side, with the connecting web therebetween. One half of the mould defines those features of the fingers which form the exterior features of the clip, while the other
 90 half of the mould defines those features of the fingers which form the interior features of the clip.
 95

Since the connecting web does not constitute the hinge of the clip, there is no loss of function if it should fracture during use of the clip. Indeed, the
 100 connecting web may be severed or removed completely prior to use of the clip. Preferably, however, it is retained until after the clip has been assembled, because automated assembly is facilitated by the attachment between the two
 105 fingers.

In contrast to the prior art clips with integral hinges, the clip of the present invention may conveniently be made from polystyrene.
 The two fingers of the clip may be pivotally
 110 connected in any suitable manner, such as by forming on one finger one or more projections, such as a rib extending crosswise across the finger, and forming in the other finger a corresponding recess or recesses to receive said projection or projections.

115 The pivotal connection between the two fingers is preferably at a point intermediate their ends, to form a clip of the "clothes-peg" type. Preferably, the pivotal connection is about half-way along the length of the fingers.

120 If the connecting web is not to be removed prior to use of the clip, it is preferably provided at a point adjacent the pivotal connection, so as not to interfere with the pivoting function.

If the connecting web is not to be removed prior to
 125 use of the clip, it is preferably from 4 to 20 mm in length, more preferably from 6 to 15 mm in length, and most preferably from 8 to 12 mm in length. If on the other hand, the connecting web is to be removed prior to use of the clip, it can conveniently be
 130 somewhat longer than this, e.g. from 20 to 50 mm. In

either case, the web may conveniently be from 1 to 20 mm wide and from 0.05 to 2 mm thick. Preferably, it is from 2 to 15 mm wide and from 0.2 to 1.5 mm thick. Most preferably, it is from 4 to 10 mm wide and 5 from 0.5 to 1.00 mm thick.

The jaws formed by the respective ends of the two fingers may conveniently be biased together by means of a generally U-shaped spring, the arms of which bear on respective outer surfaces of the two 10 fingers. Other suitable forms of spring will, of course, be apparent to those skilled in the art.

In a particularly preferred embodiment of the present invention, there is provided a clip hanger comprising a pair of clips as described above, 15 connected by a beam which is provided with means for suspending it from a clothes rail or the like.

A clip hanger according to the invention is now described by way of example, with reference to the accompanying drawings, in which:-

20 *Figure 1* is a plan view of a clip hanger,
Figure 2 is a partial end view of the clip hanger of
Figure 1, and
Figure 3 is a partial plan view, corresponding to
Figure 1, showing the clip in an intermediate stage of
25 manufacture.

Referring to *Figure 1*, a clip hanger 1 comprises a pair of spring clips 3 connected by a beam 5. A hook 7 is provided for suspending the hanger from a clothes rail.

30 Each clip 3 comprises a pair of fingers 9, 11 which are pivotally connected so that a pair of jaws is formed by the corresponding ends 13, 15 of the fingers 9, 11. The fingers are also connected by flexible web 17 in the region of the pivot point. The 35 flexible web (not drawn to scale) is 35 mm in length, 5 mm wide and 0.8 mm thick.

Each finger 9, 11 has formed therein an aperture 19, 21 to receive the bight of a generally U-shaped spring 23 the arms of which bear against the outer 40 surfaces of grooves 25, 27 formed in the fingers 9, 11. This spring thus biases the ends 13, 15 of the fingers 9, 11 together.

The hanger of *Figure 1* may be integrally moulded, for example from plastics material such as 45 polystyrene, by forming the respective fingers 9, 11 of the two clips 3 in side-by-side relationship, with the flexible web 17 extending therebetween (see *Figure 3*). It is then a simple matter to fold one finger 9 into opposing relation to the other finger 11 by 50 bending about the flexible web, and then inserting the spring 23.

It will be understood that the present invention has been described above by way of example only, and that variations in detail may be made by those skilled 55 in the art within the scope of the invention.

CLAIMS

1. A clip comprising a pair of fingers pivotally connected such that a pair of jaws is formed by corresponding ends of the fingers, and biasing means to bias the jaws together, wherein an integral flexible web connects a longitudinal side edge of one finger to the adjacent longitudinal edge of the other 60 finger.
2. A clip according to claim 1 wherein the flexible web is attached adjacent the point about which the fingers pivot.
3. A clip according to claim 1 or claim 2 wherein 65 the jaws are biased together by means of a generally U-shaped spring, the arms of which bear on the respective outer surfaces of the two fingers.
4. A clip according to any preceding claim, being formed from polyurethane.
5. A clip hanger comprising a pair of clips according to any of claims 1 to 4, connected by a beam which is provided with means for suspending it from a clothes rail or the like.
6. A method of making a clip according to any of 70 claims 1 to 4, comprising moulding the two fingers side by side, with the connecting web therebetween, and then folding the connecting web to place the fingers in opposing relation to each other.
7. A clip substantially as hereinbefore described 75 with reference to the accompanying drawings.
8. A method of manufacturing a clip substantially as hereinbefore described with reference to the accompanying drawings.

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